

TOSHIBA Field Effect Transistor Silicon N Channel Junction Type

2SK170

Low Noise Audio Amplifier Applications

Unit: mm

- Recommended for first stages of EQ and M.C. head amplifiers.
- High $|Y_{fs}|$: $|Y_{fs}| = 22 \text{ mS (typ.)}$ ($V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $I_{DSS} = 3 \text{ mA}$)
- High breakdown voltage: $V_{GDS} = -40 \text{ V}$
- Low noise: $E_n = 0.95 \text{ nV/Hz}^{1/2}$ (typ.)
($V_{DS} = 10 \text{ V}$, $I_D = 1 \text{ mA}$, $f = 1 \text{ kHz}$)
- High input impedance: $I_{GSS} = -1 \text{ nA (max)}$ ($V_{GS} = -30 \text{ V}$)

Absolute Maximum Ratings ($T_a = 25^\circ\text{C}$)

Characteristics	Symbol	Rating	Unit
Gate-drain voltage	V_{GDS}	-40	V
Gate current	I_G	10	mA
Drain power dissipation	P_D	400	mW
Junction temperature	T_j	125	$^\circ\text{C}$
Storage temperature range	T_{stg}	-55~125	$^\circ\text{C}$

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

JEDEC	TC-92
JEITA	SC-43
TOSHIBA	2-5F1D

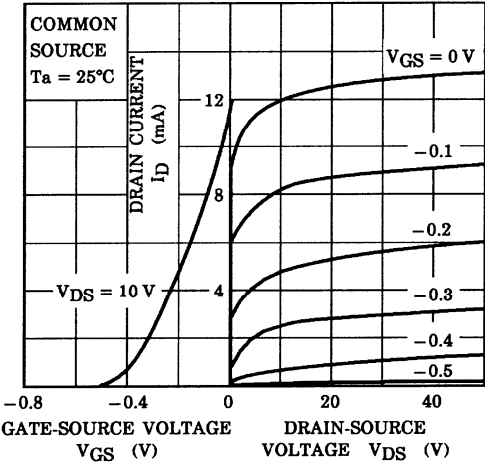
Weight: 0.21 g (typ.)

Electrical Characteristics ($T_a = 25^\circ\text{C}$)

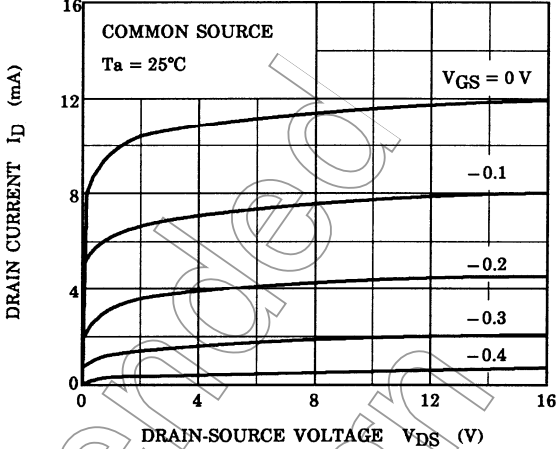
Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Gate cut-off current	I_{GSS}	$V_{GS} = -30 \text{ V}$, $V_{DS} = 0$	—	—	-1.0	nA
Gate-drain breakdown voltage	$V_{(BR)GDS}$	$V_{DS} = 0$, $I_G = -100 \mu\text{A}$	-40	—	—	V
Drain current	I_{DSS} (Note)	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0$	2.6	—	20	mA
Gate-source cut-off voltage	$V_{GS(OFF)}$	$V_{DS} = 10 \text{ V}$, $I_D = 0.1 \mu\text{A}$	-0.2	—	-1.5	V
Forward transfer admittance	$ Y_{fs} $	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ kHz}$	—	22	—	mS
Input capacitance	C_{iss}	$V_{DS} = 10 \text{ V}$, $V_{GS} = 0$, $f = 1 \text{ MHz}$	—	30	—	pF
Reverse transfer capacitance	C_{rss}	$V_{DG} = 10 \text{ V}$, $I_D = 0$, $f = 1 \text{ MHz}$	—	6	—	pF
Noise figure	NF (1)	$V_{DS} = 10 \text{ V}$, $I_D = 1.0 \text{ mA}$, $R_G = 1 \text{ k}\Omega$, $f = 1 \text{ kHz}$	—	1.0	10	dB
	NF (2)	$V_{DS} = 10 \text{ V}$, $I_D = 1.0 \text{ mA}$, $R_G = 1 \text{ k}\Omega$, $f = 1 \text{ kHz}$	—	0.5	2	

Note: I_{DSS} classification GR: 2.6~6.5 mA, BL: 6.0~12 mA, V: 10~20 mA

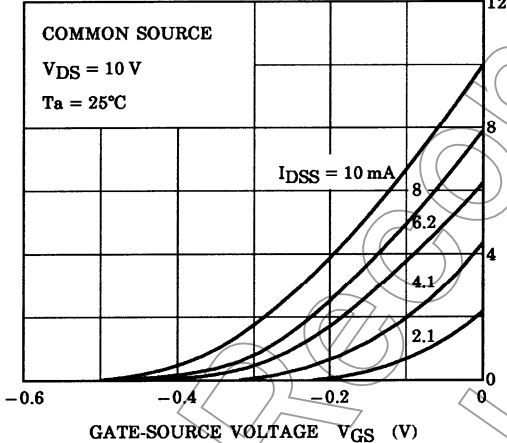
STATIC CHARACTERISTICS



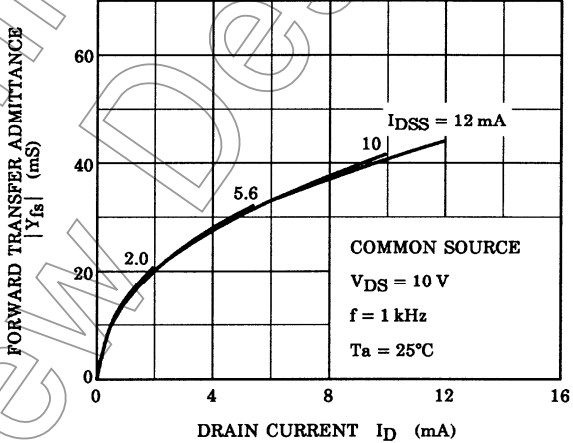
$I_D - V_{DS}$ (LOW VOLTAGE REGION)



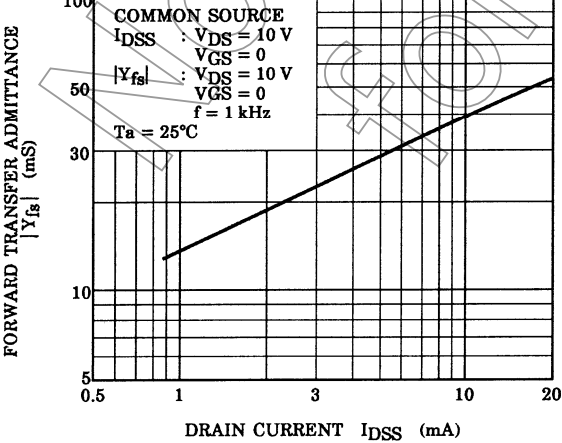
$I_D - V_{GS}$



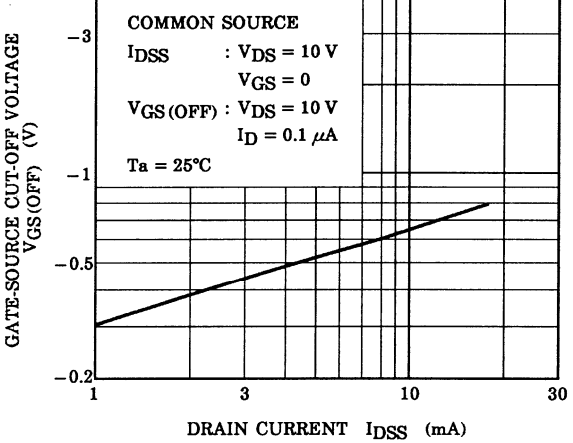
$|Y_{fs}| - I_D$

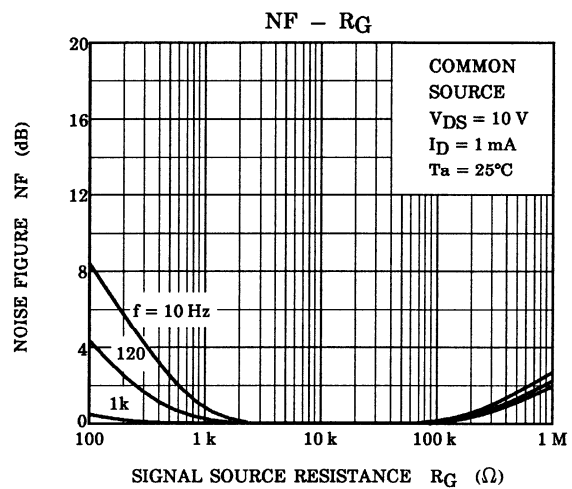
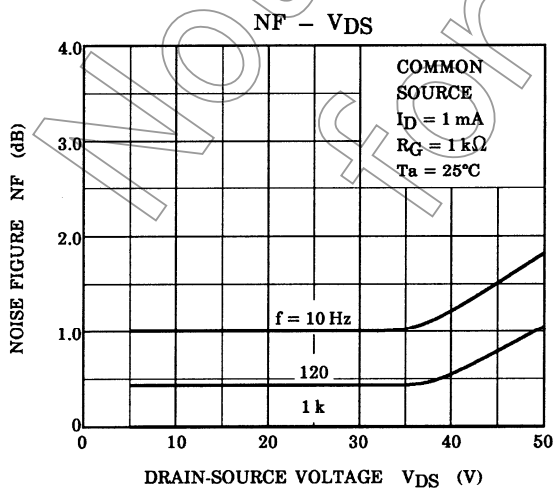
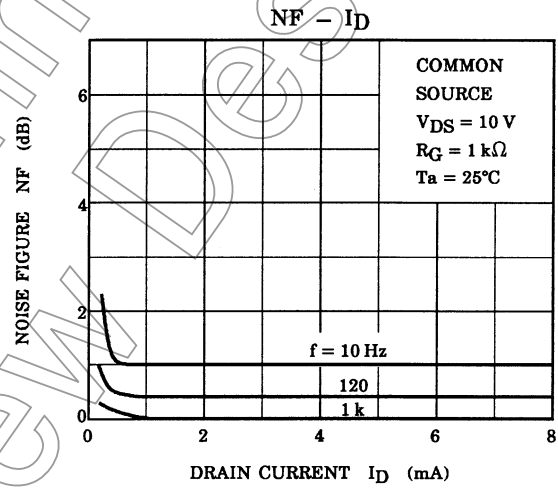
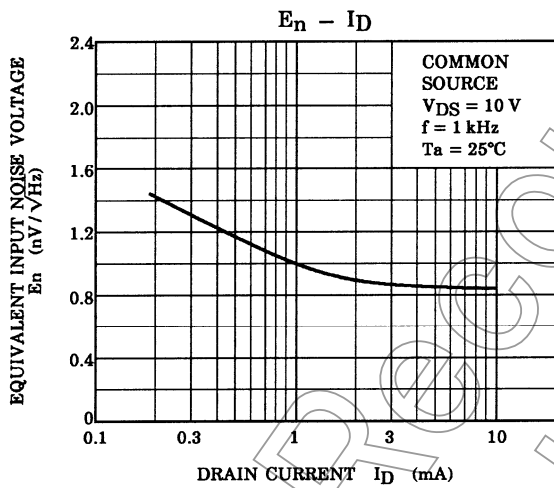
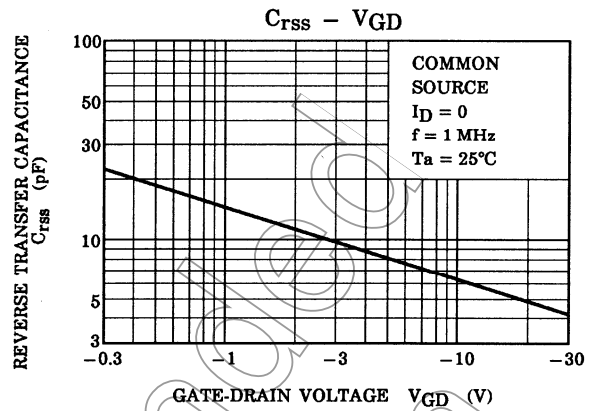
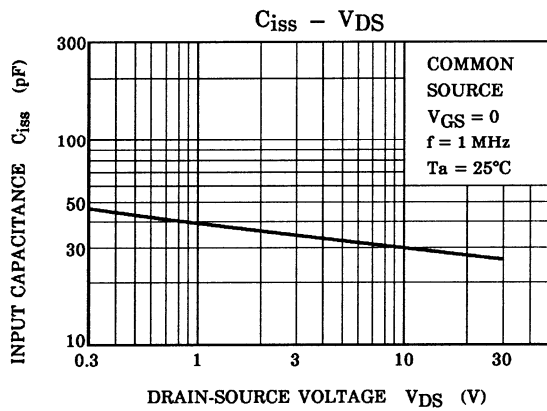


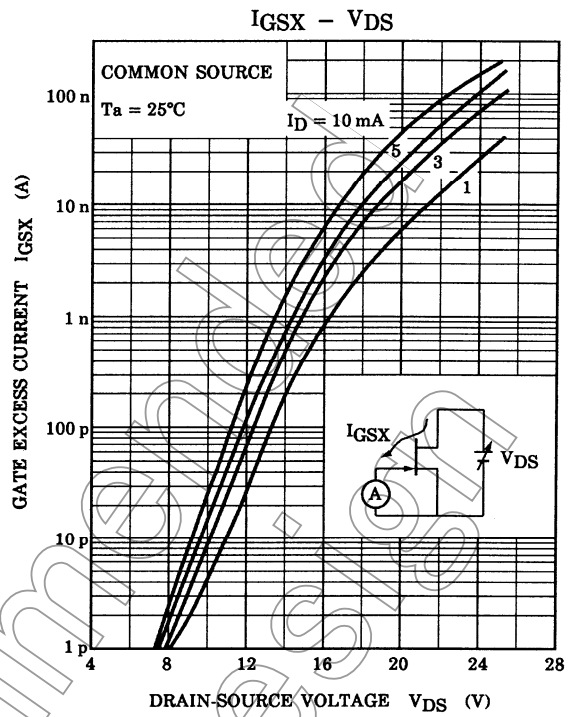
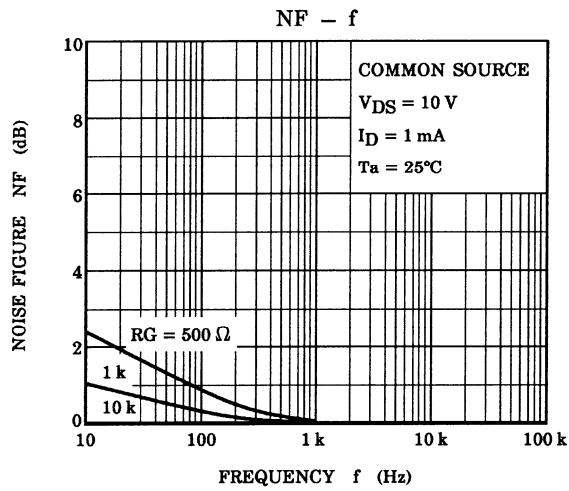
$|Y_{fs}| - I_{DSS}$



$V_{GS}(\text{OFF}) - I_{DSS}$







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